Sea-level reconstruction using GIA modeling and geological evidence at Lützow-Holm Bay during the past 50,000 years

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The reconstruction of Antarctic Ice Sheet history has been conducted by using sea-level observations combined with a glacial isostatic adjustment (GIA) modeling. Understanding the timing and amplitude of Antarctic Ice Sheet changes from the Last Glacial Maximum (LGM: ~20,000 years ago) is essential to assess the GIA effect on the present ice-sheet mass balance estimation. The timescale of GIA is from hundreds to tens of thousands of years so that sea-level records from the LGM is required to estimate the GIA effect. However, the difficulty in accessing Antarctica makes it challenging to obtain field-based evidence of ice-sheet and sea-level change from the LGM. In this presentation, we will present the preliminary results of the geomorphological survey during the 61st Japanese Antarctic Research Expedition, including bathymetry charts and water column profiles at the shallow marine waters and Lake Nurume of Langhovde in Lützow-Holm Bay. The newly obtained baseline data will be a key to reconstruct sea-level and ice-sheet changes in East Antarctica. We will also show the sea-level history during the glacial period induced by GIA modeling. Although the field-based sea-level reconstructions around 40,000 years ago are close to the present level, the present GIA ice loading histories could not reproduce this sea-level highstands. We applied a glacial isostatic adjustment modeling with refined Antarctic Ice Sheet loading histories. Our hypothesis will contribute further understanding of Antarctic Ice Sheet changes through the past, present, and future.

References

Ishiwa, T., Tokuda, Y., Itaki, T., Sasaki, S., Report on geomorphological survey in the Soya Coast (JARE61). NankyokuShiryo, in press. [in Japanese with English Abstract]